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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Timothy E. Cooper

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EXAMINER

TANG, MINH NHUT

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/781,369	Applicant(s) COOPER ET AL.	
	Examiner Minh N. Tang	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 is/are allowed.
- 6) ☐ Claim(s) 1, 3-18 and 20-31 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/7/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on September 07, 2005 is considered by the examiner.

It is noted that the documents 2004/0130312 and 2004/0201392 are crossed out because those documents were cited by the examiner in the Form PTO-892 mailed on June 01, 2005.

Claim Objections

2. Claims 6, 11-12, 15-17, 20-24, 26-29 and 31 are objected to because of the following informalities:

a/ in claim 6 and 20, all in last line, "each said probe" should be -- each of said probes --. Furthermore, in claim 20, line 5-6, "said chuck" should be -- a chuck --.

b/ in claim 26, line 1, "said effecting step" should be -- said effecting relative movement --.

c/ Applicant is advised that should claim 31, claims 21, 23, 26 and 28 be found allowable, claims 11-12, 15-17, claims 22, 24, 27 and 29, respectively, will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3-5, 7-10, 13-14, 18, and 21-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Montoya (U.S.P. 5,773,987).

As to claim 1, Montoya discloses, in Fig. 5, a method of probing an electronic device (112), said electronic device (112, Fig. 4) comprising a surface comprising a plurality of terminals (63, Fig. 6), said method comprising positioning (steps 42-44) said electronic device (112) and a plurality of probes (122) in a first relative position (θ adjustment); and effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said electronic device (112) and said probes (122) into a second relative position (Z, X and Y positions), wherein in said first relative position (θ adjustment), said probes (122) are spaced apart from said electronic device (112), in said second relative position (Z, X and Y positions), ones of said probes (122) physically contact (i.e., by Z movement) ones of said terminals (63), and said relative movement (steps 46-50) comprises a directional component (X and Y components) that is parallel to said surface of said electronic device (112).

As to claim 3, Montoya discloses, in Fig. 5, a method of probing an electronic device (112), said electronic device (112, Fig. 4) comprising a surface and a plurality of terminals (63, Fig. 6), said method comprising: positioning (steps 42-44) said electronic

device (112) and a plurality of probes (122) such that said probes (122) are adjacent ones of said terminals (63); and effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said ones of said terminals (63) into contact with said probes (122), wherein said relative movement (steps 46-50) comprises a component (i.e., x and y components) that is parallel to said surface of said electronic device (112), and said terminals (63) comprise elements (i.e., bumped wafers, see column 8, lines 10-11) that extend from the surface of the electronic device (112).

As to claim 4, Montoya discloses in Fig. 6, said terminals (63) comprise flat pads.

As to claim 5, Montoya discloses in column 8, lines 10-11, said terminals (63) comprise partial spheres (bumped wafers).

As to claim 7, Montoya discloses in Fig. 5, said relative movement (steps 46-50) further comprises a directional component (Z component) that is perpendicular to said surface of said electronic device (112).

As to claim 8, Montoya discloses in Fig. 5, testing (step 54) said electronic device (112) while said probes (122) are in contact with said ones of said terminals (63).

As to claim 9, Montoya discloses in column 3, line 48, said electronic device (112) comprises a semiconductor device.

As to claim 10, Montoya discloses in column 3, line 48, said electronic device (112) comprises a semiconductor wafer.

As to claim 13, Montoya discloses in column 4, lines 9-10, said electronic device (112) comprises a semiconductor die (114).

As to claim 14, Montoya discloses in column 4, lines 9-10, said electronic device (112) comprises a plurality of semiconductor dies (114).

As to claim 18, Montoya discloses, in Figs. 4 and 5, a program product for use in conjunction with a probing machine (Fig. 4), the program product comprising a readable storage medium (i.e., computer-implement process) and a program mechanism embedded therein, the program mechanism comprising instructions for generating first signals (i.e., signals for positioning and moving in steps 42-44) to position an electronic device (112) and a plurality of probes (122) in a first relative position (θ adjustment); and instructions for generating second signals (i.e., signals for moving probe chuck in steps 46-50) effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said electronic device (112) and said probes (122) into a second relative position (Z, X and Y positions), wherein in said first relative position (θ adjustment), said probes (122) are spaced apart from said electronic device (112), in said second relative position (Z, X and Y positions), ones of said probes (122) physically contact (i.e., by Z movement) ones of terminals (63) composing a surface of said electronic device (112), and said relative movement (steps 46-50) comprises a directional component (X and Y components) that is parallel to said surface of said electronic device (112).

As to claims 21 and 22, Montoya discloses in column 6, lines 1-11, said second signals move at least one of said probes (122) or said electronic device (112) in a single direction (X or Y direction) without changing said single direction (X or Y direction).

As to claims 23 and 24, Montoya discloses in column 6, lines 1-11, said second signals move at least one of said probe (122) or said electronic device (112) in a straight line (i.e., straight line in Z direction) from said first relative position (θ adjustment) to said second relative position (Z, X and Y positions).

As to claim 25, Montoya discloses in Figs. 4 and 5, said first signals and said second signals control movement of a chuck (110) on which said electronic device (112) is disposed, and said probes (122) are not moved.

As to claims 26 and 27, Montoya discloses in column 6, lines 1-11, said effecting relative movement (steps 46-50) comprises moving at least one of said probes (122) or said electronic device (112) in a single direction (X or Y direction) without changing said single direction (X or Y direction).

As to claims 28 and 29, Montoya discloses in column 6, lines 1-11, said effecting relative movement (steps 46-50) comprises moving at least one of said probe (122) or said electronic device (112) in a straight line (i.e., straight line in Z direction) from said first relative position (θ adjustment) to said second relative position (Z, X and Y positions).

As to claim 30, Montoya discloses in column 7, lines 5-9, said positioning (steps 42-44) in a first relative position (θ adjustment) said electronic device (112) and a plurality of probes (122) comprises moving said electronic device (112) without moving said probes (122), and said effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) comprises moving said electronic device (112) without moving said probes (122).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 6, 11-12, 15-17, 20, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montoya (U.S.P. 5,773,987) in view of Khoury et al. (U.S.P. 6,250,933).

As to claim 6, Montoya discloses, in Fig. 5, a method of probing an electronic device (112), said electronic device (112, Fig. 4) comprising a surface and a plurality of terminals (63, Fig. 6), said method comprising: positioning (steps 42-44) said electronic device (112) and a plurality of probes (122) such that said probes (122) are adjacent ones of said terminals (63); and effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said ones of said terminals (63)

into contact with said probes (122), wherein said relative movement (steps 46-50) comprises a component (i.e., x and y components) that is parallel to said surface of said electronic device (112). Montoya does not disclose each of said probes comprising a plurality of tips. Khoury et al. discloses, in Fig. 5, a contact structure comprising a plurality of probes (30), each of said probes (30) comprising a plurality of tips (31). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the probes of Montoya by providing the plurality of tips to each of the probes as taught by Khoury et al. for better contact performance.

As to claim 20, Montoya discloses, in Figs. 4 and 5, a program product for use in conjunction with a probing machine (Fig. 4), the program product comprising a readable storage medium (i.e., computer-implement process) and a program mechanism embedded therein, the program mechanism comprising instructions for generating first signals (i.e., signals for positioning and moving in steps 42-44) to position an electronic device (112) and a plurality of probes (122) such that said probes (122) are adjacent terminals (63) of said electronic device (112) disposed on a chuck (110); and instructions for generating second signals (i.e., signals for moving probe chuck in steps 46-50) effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said terminals (63) into contact with said probes (122), wherein said relative movement (steps 46-50) comprises a component (X and Y components) that is parallel to said surface of said electronic device (112). Montoya does not disclose each of said probes comprising a plurality of tips. Khoury et al. discloses, in Fig. 5, a contact structure comprising a plurality of probes (30), each of

said probes (30) comprising a plurality of tips (31). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the probes of Montoya by providing the plurality of tips to each of the probes as taught by Khoury et al. for better contact performance.

As to claims 11-12, 15-17 and 31, Montoya discloses, in Fig. 5, a method of probing an electronic device (112), said electronic device (112, Fig. 4) comprising a surface and a plurality of terminals (63, Fig. 6), said method comprising: positioning (steps 42-44) said electronic device (112) and a plurality of probes (122) such that said probes (122) are adjacent ones of said terminals (63); and effecting relative movement (steps 46-50) of said electronic device (112) and said probes (122) to bring said ones of said terminals (63) into contact with said probes (122), wherein said relative movement (steps 46-50) comprises a component (i.e., x and y components) that is parallel to said surface of said electronic device (112). Montoya does not explicitly disclose said electronic device comprising one of a package for a semiconductor device, a package for a plurality of semiconductor devices, a printed circuit board, a ceramic space transformer, and a wiring board to which a plurality of semiconductor devices are electrically connected. Khoury et al. discloses, for example, in column 1, lines 5-12, a contact structure to be used in a probe card to test semiconductor wafers, semiconductor chips, packaged semiconductor devices, module sockets, printed circuit boards and the like. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the method of Montoya by providing the electronic device in the form of packaged semiconductor devices, printed circuit boards,

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ceramic space transformer (i.e., in the form of printed circuit board), and wiring board with a plurality of semiconductor devices (i.e., module sockets) as taught by Khoury et al. so that the contact structure is not limited of testing of semiconductor wafers and dice but is inclusive of testing of other type of electronic devices. Those skilled in the art would recognize that modifications and variations could be made without departing from the spirit of the invention.

Allowable Subject Matter

8. Claim 19 is allowed over the art of record.
9. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicants, arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.
11. Applicants' arguments filed on September 07, 2005 have been fully considered but they are not persuasive.

Applicants, in the Remarks page 16, asserted that Montoya does not teach or suggest that the movement of the die substrate 60 and/or the probe 122 that brings the probe 122 and die substrate 60 into contact with each other includes a directional component that is parallel to said surface of said electronic device. The examiner respectfully disagrees because the movement in steps 46-50 of the Montoya reference including moving the probe chuck in Z direction and X-Y directions for making contact

between the probes and the pads of the semiconductor device and for scrubbing of the probes against the pads, therefore it is believed that the movement that brings the probes and the pads into contact with each other comprising a directional component (x-y components) that is parallel to the surface of the semiconductor device.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh N. Tang whose telephone number is (571) 272-1971. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R. Ramirez can be reached on (571) 272-2034. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


MINH NHUT TANG
PRIMARY EXAMINER
11/21/15